



Army Environmental Policy Institute



“Securing Our Transportation Future through Changes to the Energy Model”

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Agenda



- Dependency on Oil as the Primary Transportation Fuel: Introduction.
- Dependency on Oil as the Primary Transportation Fuel: Is There Still Enough?
- Dependency on Oil as the Primary Transportation Fuel: National Security Issues.
- Current Energy Transportation Policies.
- Contributing But Competing Transportation Energy Alternatives: Are We any Closer to a Solution?
- A Revised Governance Framework towards Energy .
- Conclusion.



Dependency on Oil as the Primary Transportation Fuel: Introduction



- Transportation is the lifeblood of any modern society
- Oil is the choice for 95% of the United States transportation energy source with nearly half of that imported
- The United States military singlehandedly consumes more energy than 85% of all nations and is the world's largest institutional oil buyer



Dependency of Oil as the Primary Transportation Fuel: Is There Still Enough?



■ Various theories.

- Half the available oil is already extracted
- Consumption of oil at now three or more times the rate of discovery with a peak production of all petroleum liquids by 2012
- Other estimates state that we had already reached peak oil production in 1970

■ Even if one does not believe that there is a lack of petroleum reserves:

- A shortage of drilling platforms, engineers and refining capacity will curtail oil production in the coming decades
- A concerted effort begun today to repair this shortage would still be at least ten years away before production could catch up with expected demand



Dependency of Oil as the Primary Transportation Fuel: National Security Issues



- Import large amounts of oil, currently at 1.5 billion barrels a year, from the nations that the State Department lists as dangerous and unstable
- The United States sends approximately \$1 billion overseas every day for imported oil
- Some of these oil producing nations are suspected in utilizing their oil revenue to sponsor terrorist activities against the United States



Dependency of Oil as the Primary Transportation Fuel: DoD Security Issues



- Most significant energy-related risk to DoD's combat capability is the burden of moving fuel
- Significant number of convoy attacks in Iraq and Afghanistan resulting in large numbers of fatalities and injuries
- In 2010 the Department of Defense consumed overall nearly five billion gallons of petroleum in military operations, costing \$13.2 billion dollars which is a 255 percent increase over 1997 prices



Current Energy Transportation Policies



- Reducing oil imports by one-third by 2025
- Reduce Oil Consumption Through Efficiencies and Conservation
- Investigate Alternative Fuel Sources



Contributing But Competing Transportation Energy Alternatives: Are We any Closer to a Solution?



- Projects do not seem to be ready for large scale commercial development
- Significant convoy security issues will still exist for the military even with an optimization of fuel usage in combat transportation vehicles
- The current path of optimizing combustion engines and alternative fuels has not resulted in any current or foreseeable future technological breakthroughs
- Therefore, serious consideration must be given to a new paradigm shift in the investigation for alternative sources of transportation fuel



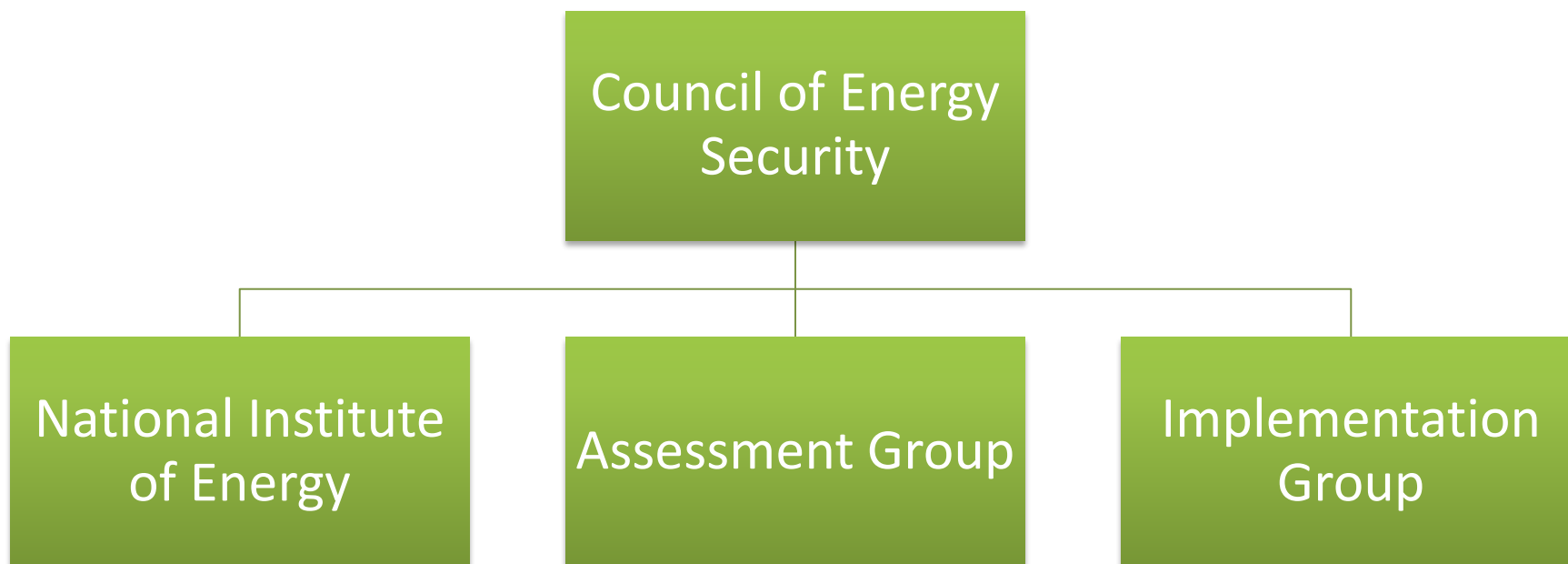
A Revised Governance Framework Towards Energy



- The entire Federal Government, to include DoD and DOE, has 11 different agencies and over 143 different programs working on the optimization of combustion engine technology, alternative energy and renewable energy for transportation
- Need for a governance board to focus and align the efforts of the many government agencies, academia, and private sector groups involved in transportation energy

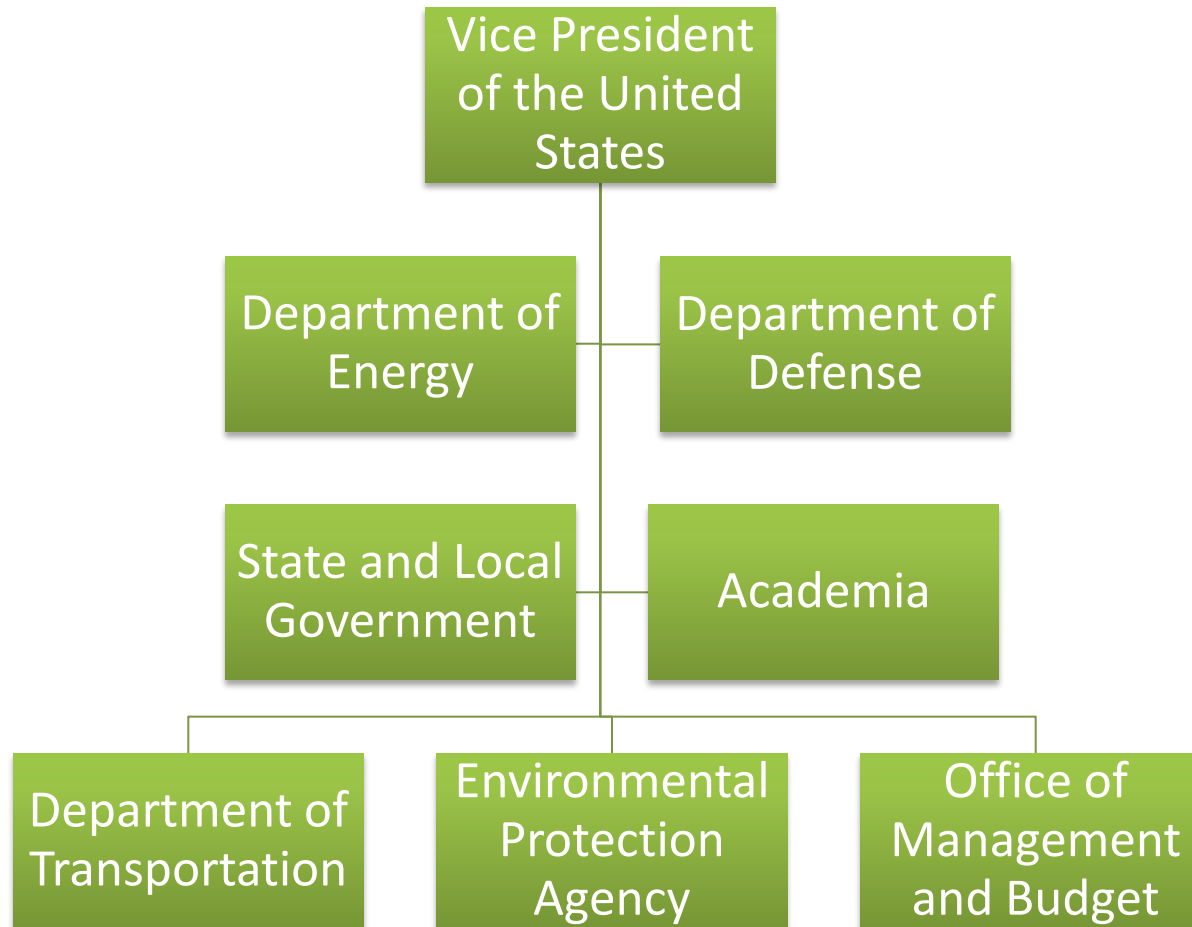


Council of Energy Security





Council Of Energy Security Members





Council of Energy Security



- The key functions of this Council would involve developing strategy, policy and policy guidance implementation for energy transportation
- Developing strategy must be national security driven:
 - The debate on the amount of oil availability in the next twenty to thirty years, as well as environmental and health issues from fossil fuels will always divide this country.
 - Goals associated in the name of national security have always received bipartisan political support and approval by the American public.
 - The strategy must be to accelerate to the market those innovations that will bolster both our economic growth and eliminate, not reduce this country's dependency on oil for transportation fuel



National Institute of Energy



- Creating an umbrella organization such as a National Institute of Energy (NIE), modeled after the successful National Institute of Health
 - Purpose is to focus a concentrated effort by leading universities and national laboratories to unleash their talents in exploring technological advances
 - Singular mission to fund and conduct groundbreaking energy research throughout the United States
 - Assist in focusing on ultimately commercializing new innovation that have reached the large prototype or commercial production stage



Assessment Group: Projects to Large Prototypes



- Determine which projects go from proof of concept to large prototype, as well as from large prototype to commercial development
- Decide which technologies would move forward based on a set criteria that have the best possibility in meeting the Council's goal
- Consist of a subset of the Council representing government agencies, academia, and the private sector
- Large prototypes would be mainly funded by the federal government



Assessment Group: Large Prototype to Commercial Development



- Reviews and validates technologies that are to be moved from large prototype to commercial
- Government agencies must approve of those innovations to ensure that a technological monopoly does not occur resulting in an increased risk to national security
- Private industry is not in the business of commercializing technologies that serve the public good and is therefore the role of government to ensure this is also captured in any technology they fund



Implementation Group



- Implementation Group will be responsible to bring these technologies to full commercial development in conjunction with the private industry
- While private industry may have a large input on the commercialization process, it will take experienced government agencies to bridge this “valley of death” portion of development
- The lead for this Implementation Group should be The Department of Defense’s Defense Advanced Research Projects Agency (DARPA) and the Department of Energy’s Advanced Research Project Agency-Energy (ARPA-E)



Funding Alternatives: Amount



- In 2010, the United States budget was \$3.6 trillion with only \$5.1 billion for energy research and development (1.34% of the budget)
- Increase basic research and development has been three to seven times the current level to \$15 to \$35 million dollars
- Increase funding for large projects a minimum \$15 to \$25 billion dollars a year



Funding Alternatives



- Redirecting or reducing current subsidies provided to the oil, gas, and coal industry
- Redirect or increase the gasoline tax
- Utilize the revenue from a greenhouse cap and trade policy.
- Create tax credits that increase deductions from 14% to 50% of qualified expenditures to include capital investments for those companies willing to invest in large prototypes or commercialized innovations



Conclusion



- The current direction of optimization of combustion engines, alternative fuels, and conservation measures have not appreciably improved the national security of the United States
- The country will continue to import a significant amount of oil each year while increasing consumption
- In fact, only modest improvements can be hoped for in the next ten to thirty years
- Given this lack of success, the time has come to change the governance structure on how energy innovations are brought to market
- Without taking a new direction in transportation energy, the United States may face a new world as a consumer of energy technology imported from foreign competitors resulting in a missed opportunity at job growth, significant decrease in the standard of living and a decline in national security and military readiness



BACK UP INFORMATION



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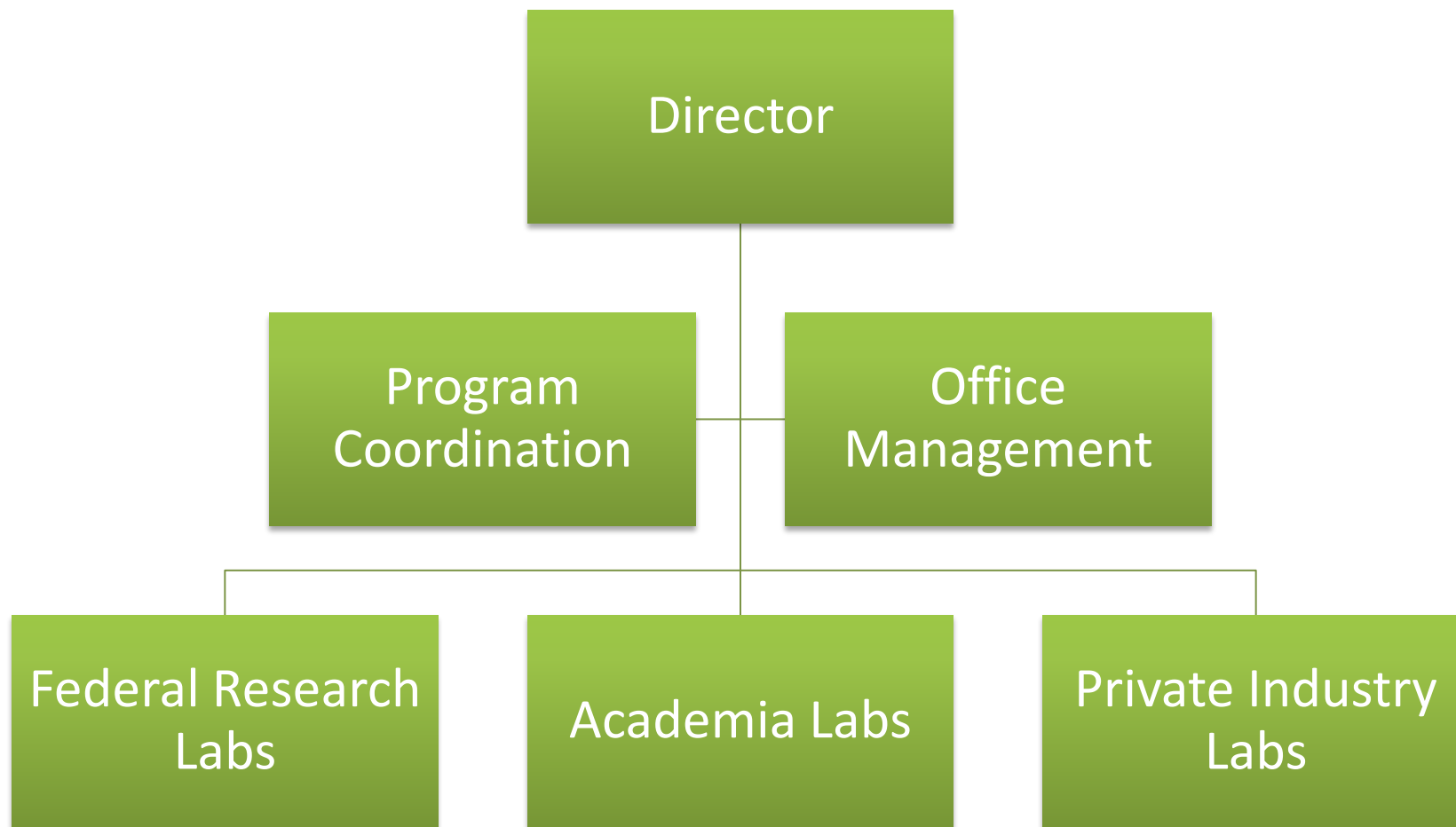
Contributing But Competing Transportation Energy Alternatives: Are We any Closer to a Solution?



- DOE's Oak Ridge National Laboratory has partnered with BMI Corporation of Greenville South Carolina to develop a simulated "Smart Truck" that has higher fuel efficiency
- Fisher Tropsch process which includes a 50/50 blend of JP8 and synthetic fuel made from coal or natural gas for B52s and C17s
- Navy's research on the use of algae as biofuels for their ships.
- Badenoch vehicle as a lighter, much more fuel efficient replacement for the High Mobility Multipurpose Wheeled Vehicle (HMMWV).

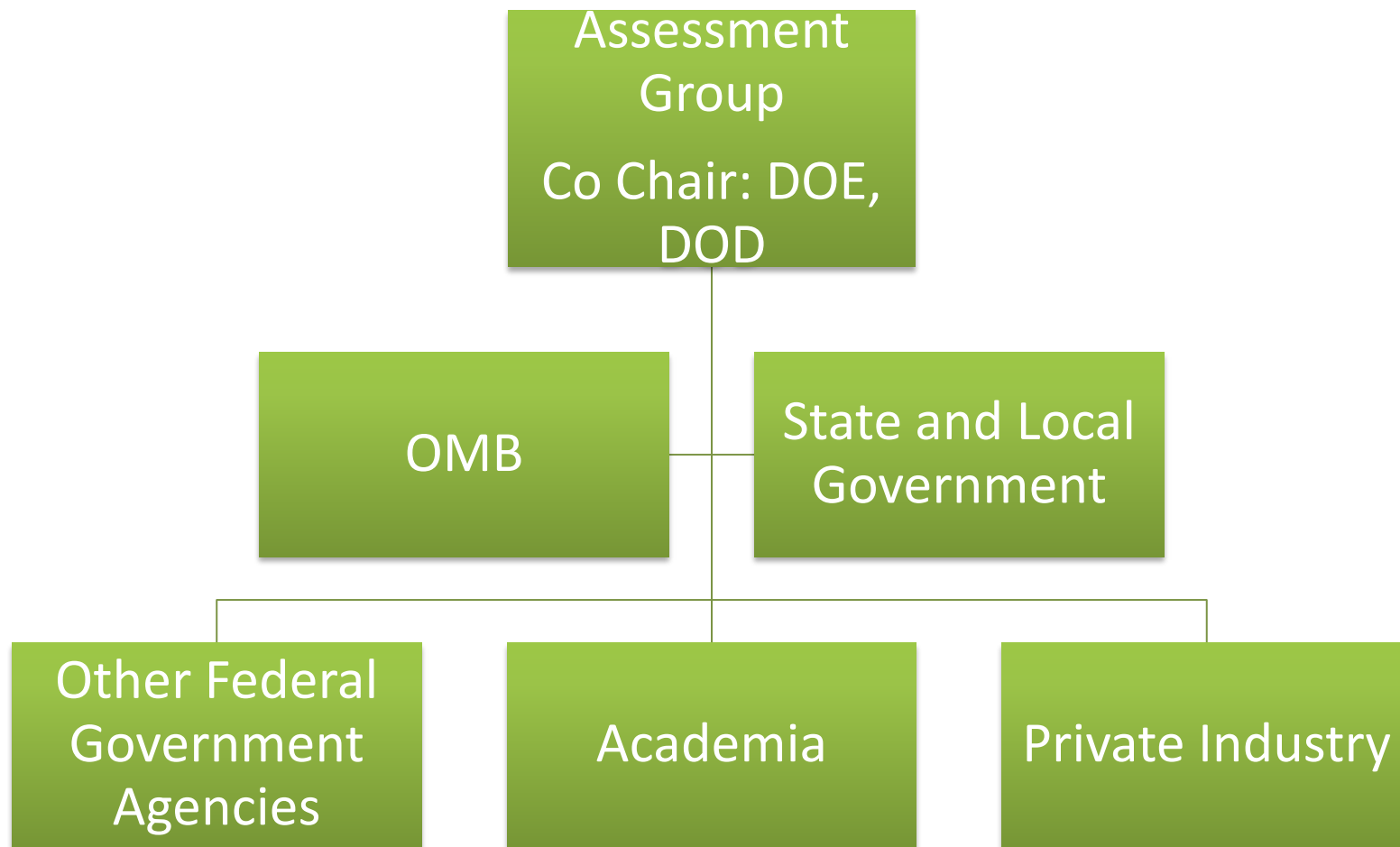


National Institute of Energy



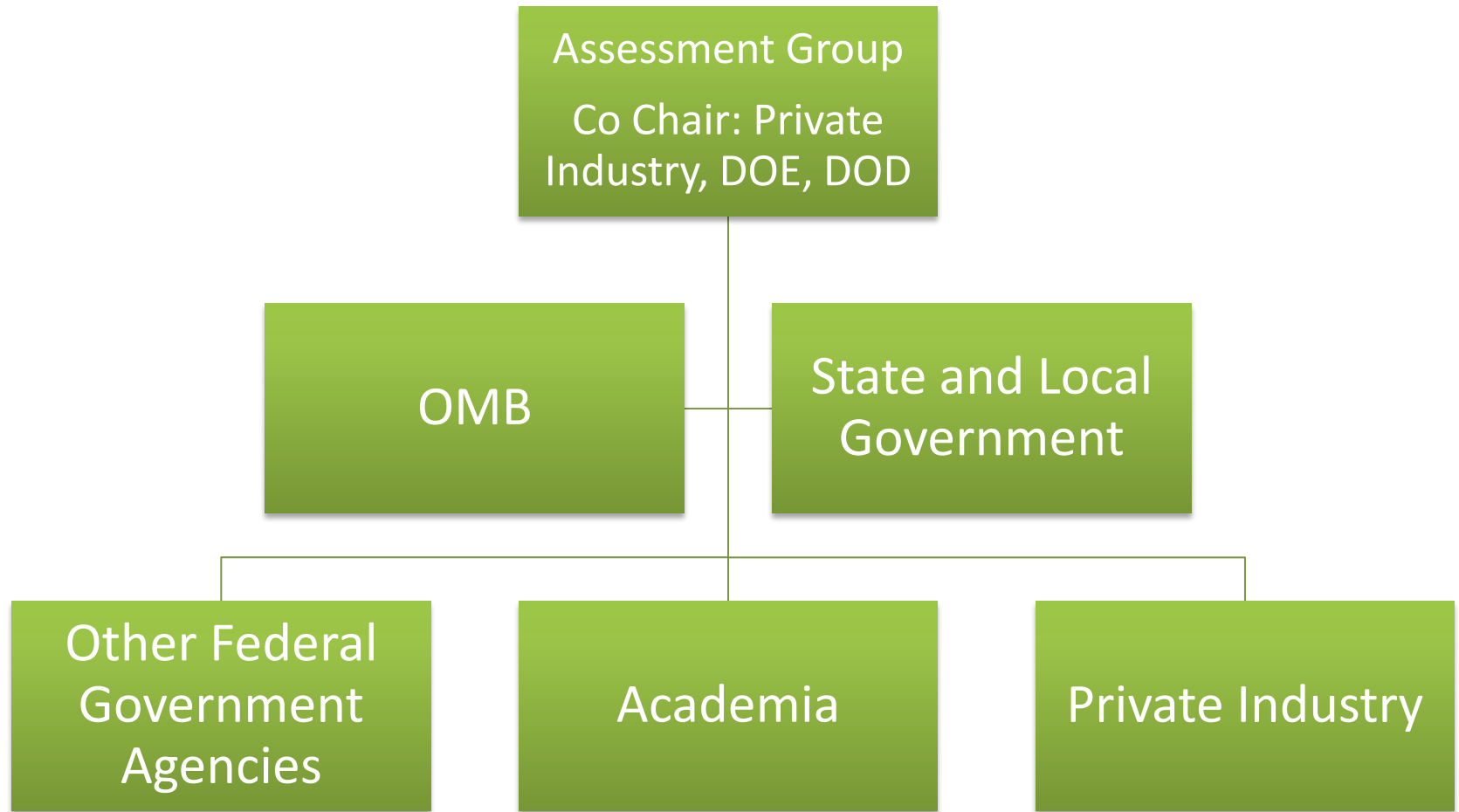


Assessment Group: Projects to Large Prototypes



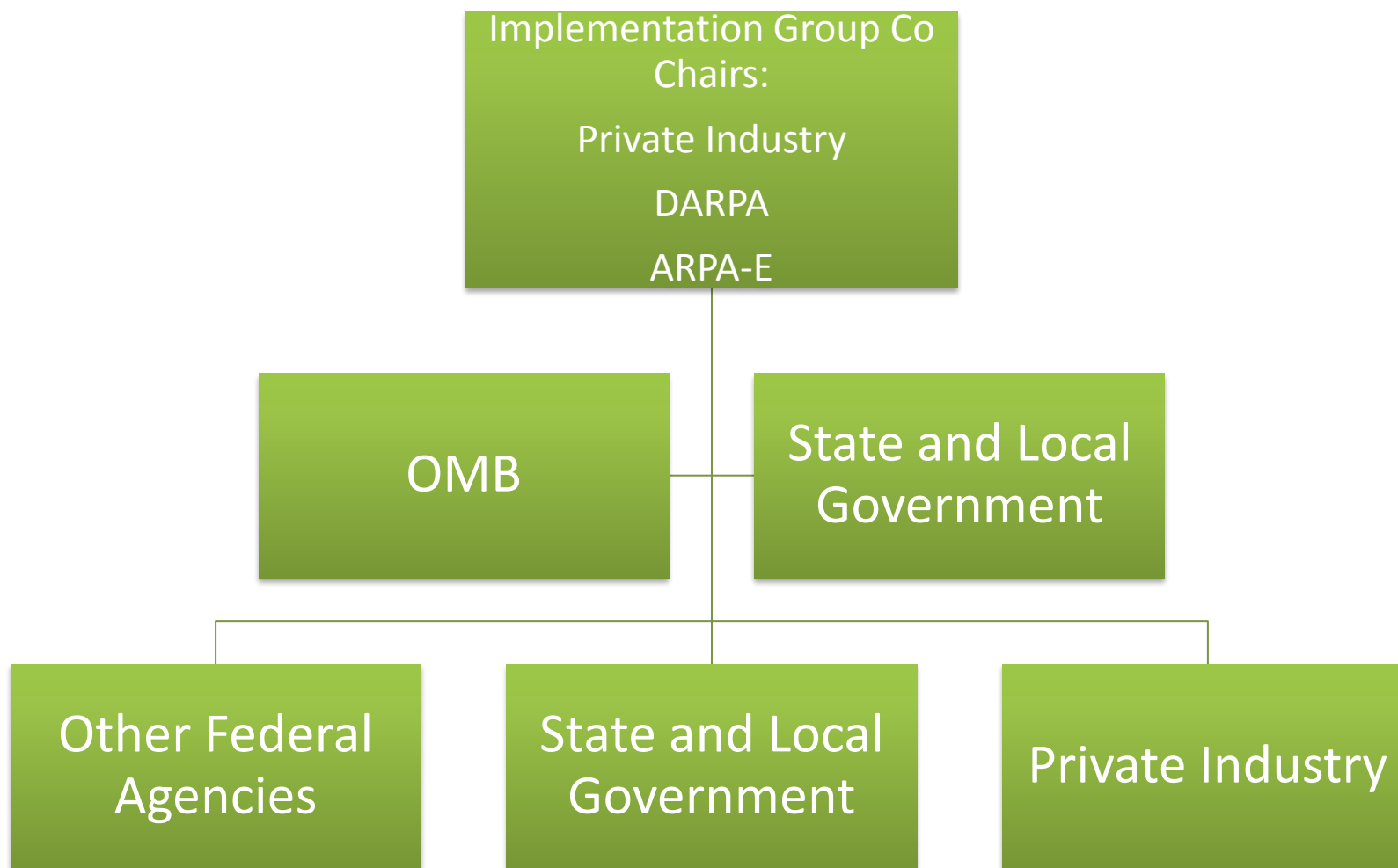


Assessment Group: Large Prototype to Commercial Development





Implementation Group





Trade Policy Initiatives



- Once an idea has been successful to go to market, American firms must have already in place the necessary trade policies to compete fairly in the world energy market
- In particular, the United States needs access to overseas markets by strengthening export promotion and protection programs.
- Other countries already have in place policies that protect their energy markets.
- China is an example where American companies are locked out of the renewable energy market.
- In China, for a foreign company to sell electric vehicles, a Chinese company must be “involved” in the most valuable part of the vehicle: battery, motor, or power electronics
- American trade policy should also require and encourage that most of the important components and assembly of United States technology be performed within the United States.
- The United States should also aggressively promote American technology abroad through the U.S. Trade Representative to lower tariffs on American goods.